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Abstract:

This report summarizes briefly the key results of a project for the development of coal-based jet fuel. The initial focus of the project was the development of a high heat sink fuel, JP-900, that could be used for thermal management as well as for propulsion energy. In the last year the focus shifted to development of a coal-based drop-in replacement for JP-8. Prototype fuel from hydrogenation of a mixture of light cycle oil and refined chemical oil met or exceeded all but four W-8 specifications. The fuel has excellent low-temperature viscosity behavior and O-ring seal swell comparable to JP-8. Deposition from thermal stressing of the fuel in various reactors was invariably lower than JP-8 or JP-8+IOO. Mechanisms of oxidative deposit formation for both jet and diesel fuels are proposed to account for the fact that the chemistry involved in both storage and thermal oxidative deposit formation in middle distillates is similar. The fuel was successfully tested in a T63 turboshaft engine, with emissions only slightly greater than JP-8. Well over a hundred publications resulted from the seven-year project period.

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